

What is claimed is:

1. A filter including three or more resonators each comprising a waveguide having an electromagnetic wave propagation region surrounded by conductors,

wherein the resonators are arranged so that an electromagnetic wave enters through an input end into one of the resonators and exits through an output end from another resonator, and

the resonators are arranged so that a plurality of propagation paths are formed between the input end and the output end.

2. A filter according to claim 1, wherein the resonators are arranged in two dimensions along a plane containing the input end and the output end.

3. A filter according to claim 1 including at least three resonators arranged adjacent to one another,

wherein a plurality of adjacent resonators are arranged in the general shape of the letter Y.

4. A filter according to claim 3, wherein the boundaries of the adjacent resonators have the general shape of the letter Y.

5. A filter according to claim 1, wherein each of the resonators has two conductive layers facing each other and sidewalls formed between the two conductive layers so that an electromagnetic wave propagates through a region formed by the two conductive layers and the sidewalls, and

the sidewalls of some or all of the resonators have branched

structures, and a plurality of resonators are coupled at the branched parts.

6. A filter according to claim 5, wherein the sidewalls of the resonators having the branched structures have the shape of the letter Y.

7. A filter according to claim 5, wherein the sidewalls of the resonators are formed by through holes through and between the conductive layers.

8. A filter according to claim 5, wherein the sidewalls of the resonators are formed by a continuous conductive wall.

9. A filter according to claim 1, wherein the electromagnetic wave propagation region has a cavity structure.

10. A method of arranging three or more resonators each comprising a waveguide having an electromagnetic wave propagation region surrounded by conductors, including:

arranging the resonators so that an electromagnetic wave enters through an input end into one of the resonators and exits through an output end from another resonator; and

arranging the resonators so that a plurality of propagation paths are formed between the input end and the output end.